

DOCUMENT RESUME

ED 288 402

FL 017 042

AUTHOR Hutchinson, Jean
 TITLE Children's Sensitivity to the Contrastive Use of Object Category Terms.
 PUB DATE Aug 86
 NOTE 10p.; In: Papers and Reports on Child Language Development, Volume 25, August 1986; see FL 017 037.
 PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
 EDRS PRICE MF01/PC01 Plus Postage.
 DESCRIPTORS *Age Differences; Child Language; *Classification; Comparative Analysis; Concept Formation; Infants; *Language Acquisition; *Language Processing; Linguistic Theory; *Mild Mental Retardation; Toddlers; *Young Children

ABSTRACT

A study investigated whether very young children use the concept of mutual exclusivity to make an initial link between a word and an object, and whether its use is linked to age or intelligence differences. Three groups of normally-developing children, aged 1 to 3 years, and three groups of older, mildly retarded children with similar levels of receptive language were asked to identify the object with an unfamiliar name, when presented with pictures of two objects. Results suggest that very young children do use the mutual exclusivity principle in making an initial link between a word and an object, at least with a small number of objects. However, young retarded children appear to have particular difficulty with the principle, suggesting that they may only be able to learn words presented in an exceptionally clear and unambiguous way. (MSE)

 * Reproductions supplied by EDRS are the best that can be made *
 * from the original document. *

ED288402

Children's Sensitivity to the Contrastive Use
of Object Category Terms

Jean Hutchinson
Vanderbilt University

FL 017042

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

E. Clark

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

- ☒ This document has been reproduced as
received from the person or organization
originating it.
☐ Minor changes have been made to improve
reproduction quality.

* Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.

Children's Sensitivity to the Contrastive Use of Object Category Terms

Jean Hutchinson
Vanderbilt University

In order for children to successfully converge on the correct meaning of a word in a limited amount of time, constraints must exist on their hypotheses about word meanings. Eve Clark has recently proposed that children follow a Principle of Contrast--that is, they assume that every two forms contrast in meaning (Clark, in press). If children are sensitive to the ways in which words contrast, this should help them to acquire and generalize words appropriately. One kind of contrast that children may be sensitive to is that between category terms: category terms are often mutually exclusive (Markman, 1984). For example, an object cannot be both a cow and a horse. The group of objects labeled by "cow" does not include any objects labeled by "horse" and vice versa.

Note that if a child makes the assumption that category terms are mutually exclusive, she will be confused when an adult tells her that a cow is also an animal. In fact, there is evidence from Macnamara (1982) and others that 2- to 3-year-old children sometimes resist labeling an object they already know another word for with a superordinate word like animal. Eventually, children will have to discover what the correct dimensions of contrast are, for pairs of words that co-refer, such as animal and cow, or vehicle and car. But the assumption that category terms are mutually exclusive would be correct for the basic level words that children tend to learn first.

There are at least two ways that use of mutual exclusivity might help in learning object category terms. It might help children to correct their overextensions of words. For example, if a child calls a cow "horsie" and is subsequently told that the cow is a "cow," she will assume that "horsie" and "cow" contrast and so be unwilling to accept both "horsie" and "cow" as labels. At first she might reject "cow" and keep her original label, but as evidence accumulates, she will eventually correct her overextension of "horsie" and accept "cow." There may be an intermediate period when she uses both words because she is not sure which word is correct. But mutual exclusivity will operate as a driving force to cause the child eventually to eliminate one word or the other.

There is a second way that mutual exclusivity might help in word learning. It might help the child decide what the speaker is referring to in the first place, when she points to a scene and labels an object in that scene. Pointing is often ambiguous. The child may not be sure what the speaker is referring to. But if she can rule out objects she already knows words for as referents of the new word, then she has a good start in making an initial mapping of the word onto the correct object.

The present experiment was designed to test whether very young children use mutual exclusivity to make an initial link between a word and an object. When first interpreting a new word, do children make

mistakes that violate the mutual exclusivity principle, or do they seem to have the knowledge that different words refer to different objects? I was interested in finding out whether children change with age in sensitivity to mutual exclusivity. I was also interested in whether there are intelligence related differences in this sensitivity.

Six groups of children took part in the study, 14 in each group, for a total of 84 children. Three groups were normally developing children at three different ages. The youngest were late 1-early 2 years of age, the middle group was about 2½ years old, and the oldest group consisted of 3-year-olds. All the children were given the receptive portion of the Sequenced Inventory of Communication Development, or SICD. This is a 20-minute standardized test that measures how well children understand words and simple commands. The normal children scored approximately at their age level on the SICD: the youngest scored at the 20-24 month level, the middle group scored at the 28-32 month level, and the oldest group scored at the 36-44 month level.

The other three groups of children were mildly to moderately retarded. They were matched to the normal children on their receptive scores on the SICD. Of course, even though their receptive language was the same, they were older. The 20-24 month level group had a mean age of 4 years, 2 months, the 28-32 month level group a mean age of 6 years, 5 months, and the 36-44 month level group a mean age of 5 years, 11 months.

The main task given to children was very simple. Children were shown pairs of pictures of objects, each pair on a separate page of a picture book. Each pair consisted of one object whose name the children knew (e.g., shoe) and one object with an unknown name (e.g., metronome). Children were asked to touch the unfamiliar object (e.g., "Touch the metronome"). If children assume that different words contrast in meaning, they should assume that "metronome" refers to an object they do not already know a word for, and so choose correctly. If they do not choose correctly--if they choose the shoe when they are asked for a metronome--then they are violating the mutual exclusivity principle.

Five unfamiliar/familiar pairs were used in the study: metronome/shoe, massager/baby, bellows/car, pump/kitty cat, and grinder/dog. Children's receptive knowledge of the words for all of these items was pretested to be sure they understood words for all the familiar items and did not understand words for all the unfamiliar items. This pretest will be discussed further later. In the mutual exclusivity task, children saw each pair of pictures twice, and they were scored as correct for a pair only if they were correct on both trials.

We would like to be able to claim that children choose an unfamiliar object because they know that the new word must refer to something they do not already have a word for. But children could simply select unfamiliar objects because they are novel, and they like them better. To try to rule out the possibility that they might choose unfamiliar objects just on the basis of salience, children were given

a pretest in which they were shown the same five pairs of pictures used in the main mutual exclusivity task. For each pair, children were simply asked to "Pick one." These neutral instructions were designed to get them to pick the one they liked, that they found most salient. Children were shown each pair twice. If a child preferred the unfamiliar object on both trials, then that object was assumed to be particularly salient for her, and the results for that object pair were not counted in the analysis of the main mutual exclusivity task.

On average, children did not find the unfamiliar items very salient. They preferred a mean of less than 1 of the unfamiliar items. The modal number of pairs dropped from a child's results because of salience of the unfamiliar item was one pair out of the five.

The results for the mutual exclusivity task are shown in Figure 1. The graph depicts the percentage of pairs that children got correct--that is, the percentage of pairs for which children chose the unfamiliar item on both trials. Chance performance is 25% (50% correct on the first trial $\times$ 50% correct on the second trial). The nonretarded (NMR) children did very well; all three groups performed well above the chance level. The late 1-early 2 year-olds got 68% correct, the 2½-year-olds got 86% correct, and the 3-year-olds got 95% correct. There was a slight improvement with age: The youngest group performed significantly worse than the oldest group (Newman-Keuls test, $p < .05$). None of the other pairwise comparisons among the normal groups were significant.

To try to pinpoint more exactly when children begin to follow the mutual exclusivity principle, I looked more closely at the youngest group. In this group, there were 4 children who scored at the 20-month level and 10 children who scored at the 24-month level on the SICD. (The SICD is scored in 4-month increments.) The average performance of the ten 24-month level children was 80% correct, which is not significantly different from either of the two older groups. It appears that the ability to exclude a familiar object and correctly choose an unfamiliar object as the referent of a new word is just starting to come in around 20 months, and is almost complete by 24 months.

The two highest level retarded (MR) groups were comparable to the matched normal groups. The retarded children who scored at the 2½-year level on the SICD got 91% correct, and the children who scored at the 3-year level got 92% correct. The 20-24 month level retarded group, however, did much more poorly. They only got 32% correct, which was not different from chance. These children did significantly worse than the matched 20-24 month level nonretarded children [$t(26) = -2.56$, $p = .017$] and indeed were significantly worse than any other group.

To summarize the results so far, normally developing children as young as late 1 were able to rule out one object they already knew a word for, and correctly pick a novel object as the referent of a new word. In contrast, 3- to 4-year-old retarded children who were functioning at the late 1-year level had particular difficulty with this strategy. Not until retarded children reached the 28-month level in receptive language did they systematically look for an object

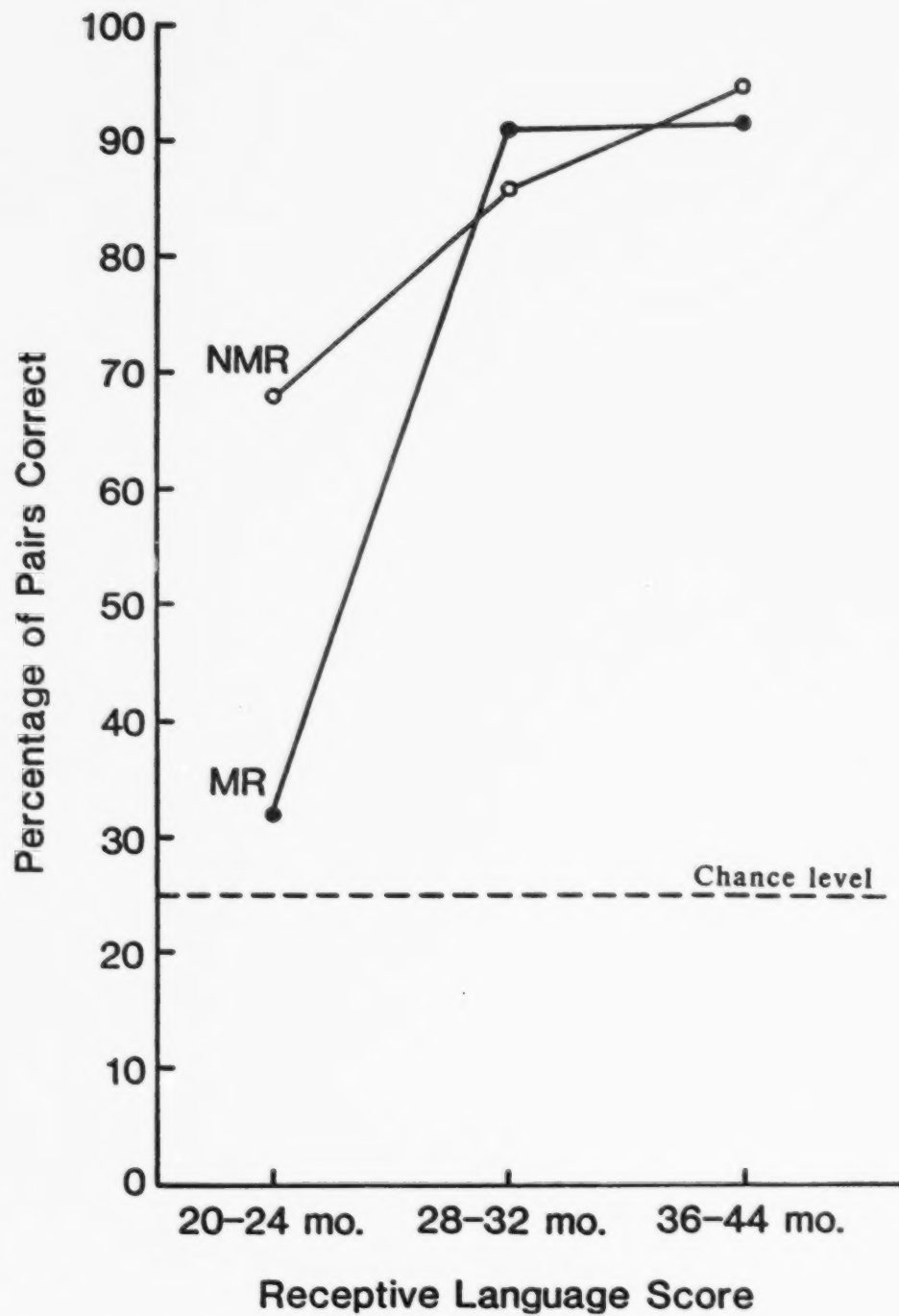


Figure 1. Percentage of stimulus pairs correct for MR and NMR children in mutual exclusivity task.

they did not know a word for when they heard a new word.

Word learning situations are not always as simple as the two-choice situation presented in the mutual exclusivity task. Often the scene is complex with many objects present. Suppose, for example, that three unfamiliar objects and one familiar object are present. Would normal children as young as 20-24 months still refrain from picking the familiar object when they heard an unfamiliar word? It happens that the pretest of receptive knowledge of the five unfamiliar words took just this form. In the pretest, children were shown four pictures: an unfamiliar target object (e.g., metronome) paired with a familiar object (e.g., shoe) as before, but with two additional unfamiliar distractors. They were asked to "touch the metronome." If children use the mutual exclusivity principle, they should refrain from picking the familiar distractor, or shoe, when asked for a metronome. Each word was tested twice, and the percentage of trials on which children chose the familiar object was determined.

The results are shown in Figure 2. The two oldest groups of nonretarded subjects rarely chose the familiar object. The 2½-year-olds chose the familiar object 5% of the time and the 3-year-olds chose the familiar object 0% of the time. The two highest-level groups of retarded subjects likewise followed the mutual exclusivity principle: the 28-32 month level and 36-44 month level children chose the familiar object 4% and 3% of the time, respectively. All four of these higher level groups chose the familiar object significantly less often than 25% of the time, the frequency that would be expected by chance.

At the 20-24 month level, however, both normal and retarded children performed at chance. They did not refrain from choosing the familiar object when they heard an unfamiliar word. The normal 20-24 month level children picked the familiar object 23% of the time, and the retarded 20-24 month level children picked the familiar object 27% of the time.

Note that in this task, the 20-24 month level normal children appear not to be following a contrastive strategy, whereas in the two-choice situation they did follow a contrastive strategy. I believe that the addition of the two extra unfamiliar objects simply overwhelmed these young children--there was no clear right answer, so they picked randomly. Thus even though these children clearly had knowledge of the contrastive use of words, they could not make use of this knowledge in situations with several possible referents. Twenty-eight-month level children, however, were able to use their knowledge of mutual exclusivity in the more complex mapping task.

In summary, making the initial mapping between a word and a referent is an essential part of inducing word meaning. Children learn a tremendous number of words in a very short time (Carey, 1979). One mechanism that may help children to do this is their assumption that different words refer to mutually exclusive categories. Given a choice between a novel object and a familiar object, children as young as late 1 correctly choose the novel object as the referent of a new word. By 28 months, children who are

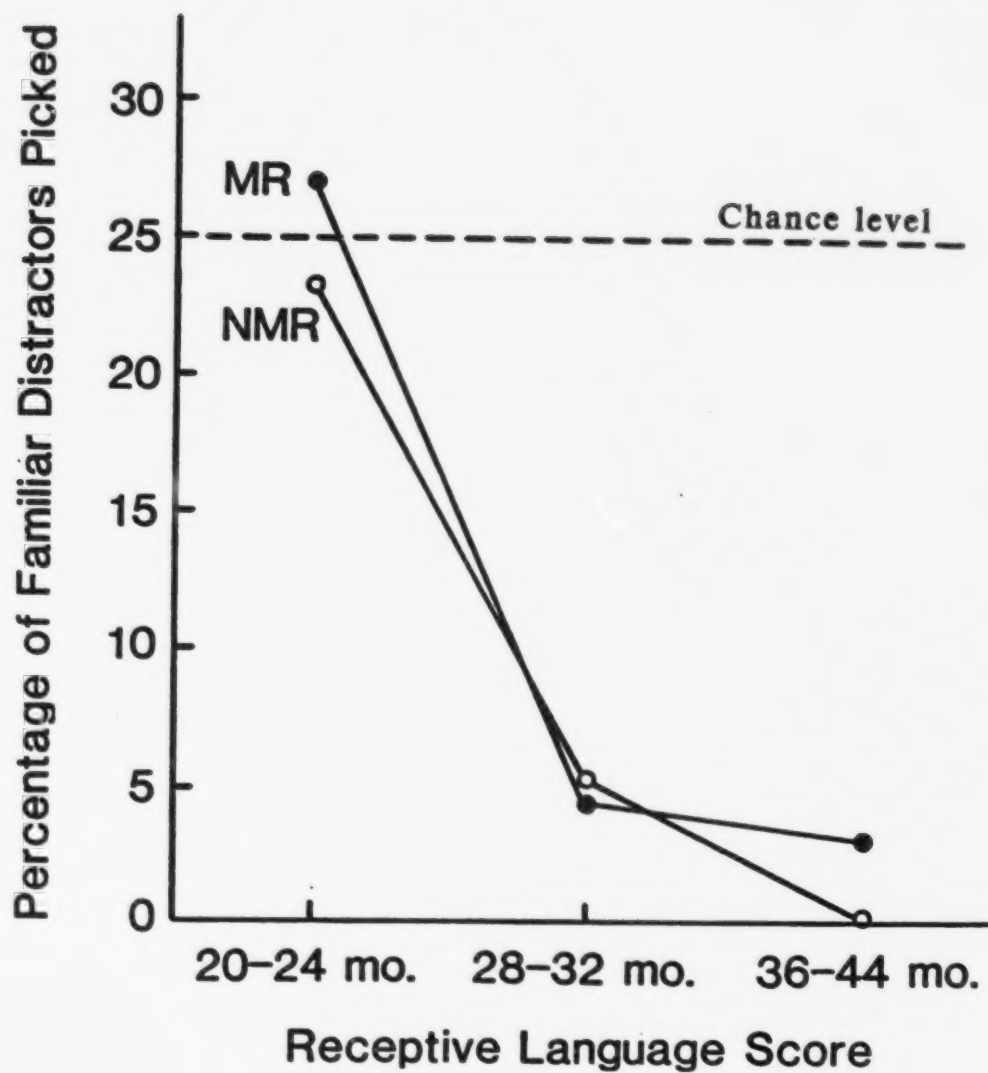


Figure 2. Percentage of familiar distractors picked by MR and NMR children in receptive pretest of unfamiliar words.

presented with three novel objects and one familiar object are able to correctly refrain from picking the familiar object when they hear a new label. In a related study, Golinkoff, Hirsh-Pasek, Baduini, and Lavalley (1985) recently found that 2½-year-olds will exclude three familiar objects and pick an unfamiliar object when they hear a new word. In sum, very young normal children do seem to use the mutual exclusivity principle in making an initial link between a word and an object, at least when the number of objects present is small.

The finding that young retarded children have particular difficulty with the mutual exclusivity principle is especially intriguing, given the possible importance of this principle for rapid and efficient word-learning. These children are relatively slow language learners, and may take as long as a year or more to make 4 months progress. Without the ability to make use of general learning strategies such as the mutual exclusivity assumption, these retarded children may only be able to pick up words that are presented in an exceptionally clear and unambiguous way. It is possible that the mutual exclusivity assumption, as well as other constraining assumptions, are necessary for language development to proceed at a normal pace.

References

- Carey, S. (1979). The child as word learner. In M. Halle, J. Bresnan, & G. Miller (Eds.), Linguistic theory and psychological reality (pp. 264-293). Cambridge, MA: MIT Press.
- Clark, E. (in press). The principle of contrast: A constraint on language acquisition. In B. MacWhinney (Ed.), Mechanisms of language acquisition: The 20th Annual Carnegie Symposium on Cognition. Hillsdale, NJ: L. Erlbaum Assoc.
- Golinkoff, R. M., Hirsh-Pasek, K., Lavalley, A., & Baduini, C. (1985, October). What's in a word?: The young child's predisposition to use lexical contrast. Paper presented at the Boston University Conference on Child Language, Boston.
- Macnamara, J. (1982). Names for things: A study of human learning. Cambridge, MA: MIT Press.
- Markman, E. M. (1984). The acquisition and hierarchical organization of categories by children. In C. Sophian (Ed.), Origins of cognitive skills: The 18th Annual Carnegie Symposium on Cognition (pp. 376-406). Hillsdale, NJ: L. Erlbaum Assoc.